

ABSTRACT OF THE DISCLOSURE

A wireless cellular communication system in which groups of cellular base stations communicate with a central office via a narrow-band millimeter wave trunk line. The transceivers are equipped with antennas providing beam divergence small enough to ensure efficient spatial and directional partitioning of the data channels so that an almost unlimited number of transceivers will be able to simultaneously use the same millimeter wave spectrum. In a preferred embodiment the trunk line communication link operates within the 92 to 95 GHz portion of the millimeter spectrum. A large number of base stations are each allocated a few MHz portion of a 900 MHz bandwidth of the millimeter wave trunk line. A first transceiver transmits at a first bandwidth and receives at a second bandwidth both within the above spectral range. A second transceiver transmits at the second bandwidth and receives at the first bandwidth. Antennas are described to maintain beam directional stability to less than one-half the half-power beam width. In a preferred embodiment the first and second spectral ranges are 92.3-93.2 GHz and 94.1-95.0 GHz and the half power beam width is about 0.36 degrees or less. Thus, in this system the low frequency band width is efficiently utilized over and over again by dividing a territory into small cells and using low power antenna. And a higher frequency bandwidth is efficiently utilized over and over again by using transmitting antennae that are designed to produce very narrow beams directed at receiving antennae. In a preferred embodiment cellular base stations are prepackaged for easy quick installation at convenient locations such as the tops of commercial buildings.

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